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INVENTORY

YUKON REGION

FOREST RESOURCES

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RESOURCE PLANNING TEAM

JOINT FEDERAL-STATE LAND USE PLANNING COMMISSION

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RESOURCE PLANNING TEAM

RESOURCES INVENTORY

YUKON REGION

FOREST RESOURCES

by

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Joint Federal-State Land Use Planning Commission
May 1974

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LAND RESOURCES

I. Physical Description

The Yukon Region is the largest of six hydrologic regions in Alaska. The region includes the entire Yukon drainage in Alaska and reaches from the Alaska Range to the Brooks Range and from Canada to the Bering Sea. The region contains approximately 130.6 million acres and 61,000 people. This means that about 20 percent of the State's population and 35 percent of its surface area are within the Yukon Region. About three fourths of the region's population is located in the Fairbanks area and the remainder are dispersed throughout the region, mainly along the Yukon and its tributaries.

Although this region receives a relatively small volume of rainfall, seven to thirty inches annually, between two to three percent of the area is in lakes 40 acres or larger and streams one-eighth mile or more in width.

A variety of vegetation, topography, and climate characterize this area. A major influence on timber type and growth is the presence of permafrost throughout the region. The moisture contained and held by the permafrost negates, to a large extent, the relative lack of rainfall. Except for southern exposures, vegetation is not limited by the low rainfall.

This vegetative growth is also greatly influenced by the cold winters, fairly warm summers, and short growing seasons. The summer months allow enough thawing to allow for root development.

II Land Ownership

While title to over 99 percent of the land is presently vested in the U. S. Government, much of the land will eventually be patented to the State and to the Native Corporations. The major land owners and withdrawals are listed below with approximate acreages.

Federal - Except BLM

Military	2,244,000
National Park Service	1,670,000
Bureau of Sport Fisheries & Wildlife	3,495,000
Coast Guard	1,000

Bureau of Land Management

Transportation & Utility Corridors	3,520,000
Refuge Replacement	265,000
d1 Withdrawals	29,755,000
Rampart Power Project	8,958,000
d2 Withdrawals	29,678,000
d2 Native Regional Deficiency Withdrawals	320,000

Native Withdrawals

Village	23,750,000
Village Deficiency	540,000
Regional Deficiency	13,450,000
Former Reservations	2,568,000

State

Patented	1,000,000
Tentatively Approved	2,112,000
Selected	18,400,000

Borough (Fairbanks North Star)

Applied for	(29,830)
Approved	(12,820)
Patented	(5,790)

Patented

The land ownership will definitely change and settle down somewhat over the next several years. Approximately 44 million acres statewide will be patented to the various Native regional and village corporations. Village corporations must complete their selections by December 18, 1974. Regional corporations have until December 18, 1975 to complete their selections. The Doyon Corporation will exert a major influence on land management activities in the region. They will ultimately receive patent to 8.46 million acres with another 4.06 million acres to be patented to the village's corporation within the regional boundaries.

The State was allowed 25 years from Statehood to complete their 104 million acres of selections. The selections total approximately 60 million acres to date, not counting some 1972 selections which were in conflict with withdrawals for Native selection purposes.

The Borough lands listed previously are included in total State acreages and should not be included again to approximate a total acreage figure. The organized boroughs are authorized to select up to ten percent of the vacant unappropriated State land within their boundaries. Overlap occurs between some of the categories listed above including most of the Rampart withdrawal with other categories (8.1 million acres), State lands with village withdrawals (2.3 million acres), refuge lands with village withdrawals (.8 million acres), and patented lands with several categories (.2 million acres).

III Forest Ecosystems

Generally, the forest type in this region occupies the valleys, stream bottoms, and low benches. Timberline varies from 2,000 to 3,000 feet.

The forest inventory data (Table #1) for this report comes largely from unpublished tables of the U. S. Forest Service. Until this survey, very little information was available concerning the quality and quantity of Interior Alaska timber. The boundaries of the USFS inventory very closely follow the Yukon Region. The slight differences in total land areas, commercial timber, etc., used in this report are the result of non-coinciding boundaries. For purposes of this report, these differences are insignificant.

The Yukon Region contains approximately 78.6 million acres of forest lands. These can be divided into three general forest ecosystems:

Bottom land spruce-poplar

Upland spruce-hardwood

Lowland spruce-hardwood

Bottom land Spruce-Poplar Ecosystems

This tall, relatively dense interior forest system is primarily white spruce, locally mixed with balsam poplar. In general, the commercial stands of white spruce are on level to nearly level flood plains and low river terraces. Studies along the upper Yukon indicate that stands usually contain a series of diameters with few trees of a large size. The larger trees encountered were just under 16 inches in diameter and the tallest trees were 90 feet in height.

Trees on favorable sites in this region have been reported with diameters of 24 inches and heights of 110 feet.

Balsam poplar usually occurs with white spruce as a successional system. It grows rapidly and is replaced at maturity by white spruce. Poplar invades flood plains and deglaciated valleys averaging 70-80 feet in height and 12-18 inches in diameter.

This system occupies water-deposited soils of river valleys and adjacent lower slopes, from the lower Yukon valley to the Canadian border and northward from Bristol Bay to the south slopes of the Brooks Range. Valley soils are deep, well-drained, stratified sandy and silty soils without permafrost, occupying terraces and flood plains.

Soils of slopes along the Yukon and Tanana Rivers are: 1) well-drained shallow gravelly soils over bedrock; 2) well-drained silt loams of shallow depth over bedrock; and 3) windblown silts on lower slopes and high terraces. Site exposure for this system on uplands is limited to east, west and south-facing slopes in the Tanana valley, gradually limited to southern exposures in western and northern sections of the interior. Permafrost is deep or absent on lower slopes and absent on steep gravelly slopes.

In the Susitna and Copper River valleys, this system occupies stratified silts and sands of low river terraces and well-drained shallow to deep silt loam soils over gravelly drift, moraines, terraces and valley side slopes.

Upland Spruce-Hardwood Forest Ecosystem

This ecosystem is a fairly dense interior forest composed of white spruce, birch, aspen, and balsam poplar. Black spruce typically grows on north slopes and poorly drained flat areas. Root depths are shallow. Fire scars are common.

White spruce averaging 40 to 80 feet in height and up to 15 inches in diameter occurs in mixed stands on south-facing slopes and well-drained soils; forms pure stands near streams.

White birch stands tend to be even-aged and more uniform in size than spruce stands. Studies show the largest trees are up to eight inches in diameter and 50 feet tall.

Aspen predominates on well to excessively drained southern slopes. Trees are found up to ten inches in diameter and 50 feet tall. Average diameters are four inches or less.

Soils supporting the upland spruce-hardwood type in the eastern interior highlands occupy slopes of hills, ridges and low mountains. These are well-drained shallow to moderately deep gravelly loams and silt loams over coarse materials, with permafrost on sites supporting black spruce-hardwood. Soils on north slopes are shallow and gravelly with continuous permafrost. Upland spruce on south-facing slopes of the Brooks Range occupy well-drained, shallow, gravelly terrace soils and shallow silt loams on adjacent slopes.

Soils of the Central Yukon Highlands occupy steep slopes of knolls, and low ridges and low mountains, and lower slopes and terraces in valleys. Soils of knolls, ridges and low mountains are shallow, well-drained and gravelly. Moderately deep, poorly to well-drained loams occupy lower slopes and terraces. Windblown silt mantles low slopes adjacent to river valleys. Wet soils under black spruce on low slopes and in valley bottoms have permafrost.

Soils of the Kuskokwim Mountains and Nulato Hills are well-drained silty and gravelly loams, moderately deep on south slopes of hills and moraines.

Lowland Spruce-Hardwood Forest Ecosystem

This ecosystem is a dense to open interior lowland forest of evergreen and deciduous trees, including extensive pure stands of black spruce. Black spruce are slow growing and seldom exceed eight inches in diameter or 50 feet in height. Cones of this tree open after fire and spread abundant seed, enabling black spruce to quickly invade burned areas. The slow-growing stunted tamarack is associated with black spruce in the wet lowlands. Like black spruce, it is of little commercial value, seldom reaching a diameter of more than six inches.

Rolling basins and knolls in the lowlands have a varied mixture of white spruce, black spruce, paper birch, aspen and balsam poplar. Small bogs and muskegs are found in the depressions.

Soils of interior lowlands supporting this system are deep, wet, silty and loamy textured, with thick surface peat layers and permafrost. Underlying materials are deep stratified sands, silts and gravels. Soils on adjoining terraces and low slopes are shallow to moderately deep, well-drained silt loams in windblown materials, overlying coarse tills and water-deposited materials. Permafrost is discontinuous.

Soils in the Copper River lowland supporting this system are deep, wet and fine-textured overlying water-laid clayey materials with continuous permafrost. The system also occupies loamy soils with permafrost on adjacent high terraces and low mountain slopes, overlying coarse to medium-textured tills.

The ecosystem occupies large areas of outwash extending along the west flank of the Alaska Range from Kantishna to Stony River. Soils are poorly-drained, loamy with a thin overlying peat layer and permafrost. Underlying deposits are stratified sands and gravels. Silt loams supporting lowland spruce-hardwood in the Nushagak valley have permafrost on lower slopes, in drainages and depressions. ^π Areas covered by these forest ecosystems are shown below:

The Yukon Region

<u>Ecosystems Type</u>	<u>Acres (millions)</u>	<u>Percent of State Total</u>
Bottom land Spruce-Poplar	12.0	67%
Upland Spruce-Hardwood	43.4	68%
Lowland Spruce-Hardwood	23.2	66%

While there is obviously an immense forest area within this region, it is important to remember that slightly less than one fourth of it can be classified as commercial forest land; and, to further put the region into its proper perspective, only about two percent of the total Alaskan volume is cut from the interior lands. Alaska's coastal forest provides the large (98 percent) share of the annual cut. Volume per acre is low, usually less than 1,500 board feet. The acreage classified as saw timber averages about 3,270 board feet per acre.

It is helpful to review a few basic definitions when discussing forest resources. The following are from the USFS:

Forest land - includes (a) lands that are at least ten percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting influence on the climate or on the water regime; (b) land from which trees have been removed to less than ten percent stocking, and which has not been developed for other use. (Forested tracts and islands of less than ten acres and isolated strips of timber less than 120 feet wide are excluded.)

Commercial - Forest land which is (a) producing or capable of producing usable crops of industrial wood (will net a minimum of 8,000 board feet per acre, International one fourth inch rule); (b) economically accessible now or in the foreseeable future; and (c) not withdrawn from timber utilization.

Noncommercial - Forest land incapable of producing usable industrial wood because of adverse site conditions or withdrawn for specified purposes.

Unproductive - Noncommercial forest land which does not now support or will not produce a minimum of 8,000 board feet per acre.

Productive - Forest land capable of producing usable crops of industrial wood, but withdrawn for specified purposes through statute, ordinance, or administrative order.

The USFS used, for Interior Alaska, a lower productivity figure to define commercial forest land. A 15 cubic foot per acre MAI (mean annual increment) standard was adopted.

The table shown in Appendix I was extracted from the USFS data. These five units correspond very closely to the boundaries of the Yukon Region. As this inventory is by far the most comprehensive yet undertaken for Interior Alaska, anyone interested in specific data should contact the USFS.

Economic Utility

The Yukon forest region has several major factors against it in trying to compete on the world markets. The low volume per acre stands, high logging and transportation costs, and the expensive milling plants required, work to disenchant any large-scale investment. A major factor

in determining the use these areas is the future land ownership and corresponding management objectives. When this important decision is finally made, and tenure is permanently determined, a more definite policy can be established.

IV Fire

Fire has played an important role in the composition, size, and quality of the Yukon's forest. Roger Robinson, former BLM fire control officer in Alaska, estimates that roughly 80 percent of Interior Alaska has been burned over from one to twelve times. This accounts considerably for the great acreages of forest land which must be classified as noncommercial.

The edges of burns are usually well-defined by abrupt changes in timber type. The more fire resistant aspen and birch contrast sharply with the spruce. Many presently treeless areas formerly supported commercial forest stands.

Fire damage to commercial timber lands has, in recent years, been minimized. Improved fire protection by the BLM has substantially reduced timber losses. In addition, the larger fires occur primarily in remote higher country where little commercial timber is present. Also, some recent information indicates that commercial forest land satisfactorily regenerated itself following a burn. Fire damage to noncommercial forest lands also appears to have lessened and in some instances fire has assisted in converting noncommercial forest to commercial stands.

Fire effects are obviously not all detrimental. Browse for moose results from fire. The management goals and objectives must necessarily dictate the type and degree of fire control activities.

V. Access and Transportation

The three obvious methods of transportation include:

1. Aircraft, including airplanes, helicopters, home craft and even balloons.
2. All terrain and standard road vehicles.
3. Boats and other water vehicles.

Most of the forest lands are directly accessible from the major rivers and river travel by boat will probably be the major transportation of people into the forest zones and products from the forests. Various types of aircraft could be used to put people into any of the forest zones and transport forest products out of the harvest or processing area if the timber is needed and other forms of transportation are not feasible. Air access to remote lakes and streams and wheeled and ski equipped aircraft landings on areas free of vegetation is possible. Winter use of aircraft fitted with skis in place of floats or wheels could provide access to otherwise remote and inaccessible forests primarily the upland hardwood/spruce type to put in field crews or remove forest products.

Helicopters, balloons, and various aerial tramways have been used to transport logs from the woods in many areas. They could also be used to ferry processing machinery into the harvesting area and transport out finished products. Overland access and transportation would be via

various all terrain vehicles over the frozen surface in winter months or via the few roads and trails which connect villages or which connect a resource development area to another transportation transfer center.

Boat access and transportation is the most practical method of transportation. The bottom land spruce/poplar forests are located in the flood plain and along the banks of all the larger rivers and extend back from the river and slough banks up to about one mile. Because of the great number of side sloughs, oxbows and old channels, logging activities and product transportation would be more complicated. Camps would have to be moved often as the resource is basically a ribbon of trees along the river banks. The upland timber types would probably be inaccessible to river transportation because of excessive distance from the streams, but certain upland forests have relatively easy access from some lakes, or by all terrain vehicles traveling cross-country preferably over snow in the winter season.

Economic analysis would have to be conducted to evaluate all transportation methods considering values and uses of the final products market location, utilization, cost of substitute products such as synthetics, aluminum, and importation of similar wood products from some other area.

VI General forest land values and uses

From a recreation, aesthetic or scenic aspect, the forests of the Yukon Region are usually viewed from an airplane or river boat. They enhance the general vast, distant, and open vista and offer color and texture

variety. Most of the recreation in the region is in conjunction with hunting, fishing, and sightseeing.

Most hunting and fishing is for subsistence uses by local residents, with a minor amount of sport fishing and hunting done by "outside" tourist and Alaskans from other parts of the State.

The potential for development of a sizeable tourist industry appears to be good. The creation of some of the National Parks, Monuments, Historic areas and Wildlife Refuges should attract tourists to view and experience some of the unique natural attractions the region offers.

The Yukon Region provides the best and most productive areas in the State. for ducks and geese. Moose are found in high densities, perhaps second only to the Kenai, statewide. This area also serves as the critical winter range for several caribou herds, including the Porcupine Herd. Fishing activities are confined to subsistence and sport fishing.

INTERIOR ALASKA

Forest Survey Units

UNIT	Area In Acres			GROWING STOCK VOLUME On Commercial, Forest Land					
	LAND			VOLUME (cu. ft.)			VOLUME (bd. ft.)		
	Total Land Area	Total Forest Land	Commercial Forest Land	Hardwoods	Softwoods	Total Cubic feet	Hardwoods	Softwoods	Total Board feet
Tanana/ Fairbanks	20,266,000	12,989,000	4,365,000	1,120,046	1,545,845	2,665,891	980,593	4,174,965	5,155,558
Upper Tanana	13,634,000	6,746,000	1,554,000	203,949	719,519	923,468	124,968	1,840,226	1,965,194
Copper River	16,425,000	4,431,000	1,178,000	93,020	912,042	1,005,062	52,464	1,407,961	1,460,425
Upper Yukon	36,928,000	22,556,000	6,663,000	905,202	2,429,115	3,334,317	675,025	6,346,096	7,021,121
Lower Yukon	<u>44,975,000</u>	<u>30,004,000</u>	<u>4,743,000</u>	<u>666,589</u>	<u>1,451,442</u>	<u>2,118,031</u>	<u>742,401</u>	<u>4,728,941</u>	<u>5,471,342</u>
TOTALS	132,228,000	76,726,000	18,503,000	2,988,806	7,057,963	10,046,769	2,575,451	18,498,189	21,073,640

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